

**SYNCLAVIER® II
OPERATING SYSTEM
RELEASE H**

DOCUMENTATION UPDATE

July 1, 1983

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RELEASE H**

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This documentation update describes the new features in Release H of the Synclavier® II operating system. Release H is part of a complete software revision, consisting of three program updates released at the same time.

These programs are:

1. Release H of the Synclavier® II Real-Time Performance System which includes the software for control of the new Stereo Option, as well as several additional timbre control, keyboard performance, and memory recorder enhancements. Release H Alphanumerical and Graphical Timbre Display Systems are also available.
2. Release B of the Music Printing Option, which is an extensively improved Music Printing program, allowing time and key signature changes, additional editing capabilities, control over voicing and formatting, and other features.
3. SCRIPT Release H, which supersedes SCRIPT Level I, SCRIPT Level II, and SCRIPT Release G, and which links the new Synclavier® II features and the new Music Printing features.

NOTE: Users must still purchase a Music Printing License for the Music Printing Program, and the SCRIPT/MAX/XPL Software License for the SCRIPT software update. These two programs are mentioned here because they have been developed to work together with Release H of the Synclavier® II operating system. The Synclavier operating system license is standard with a Synclavier.

This document covers the new features in the Synclavier® II real-time system. A separate document covers both Music Printing Release B and SCRIPT Release H.

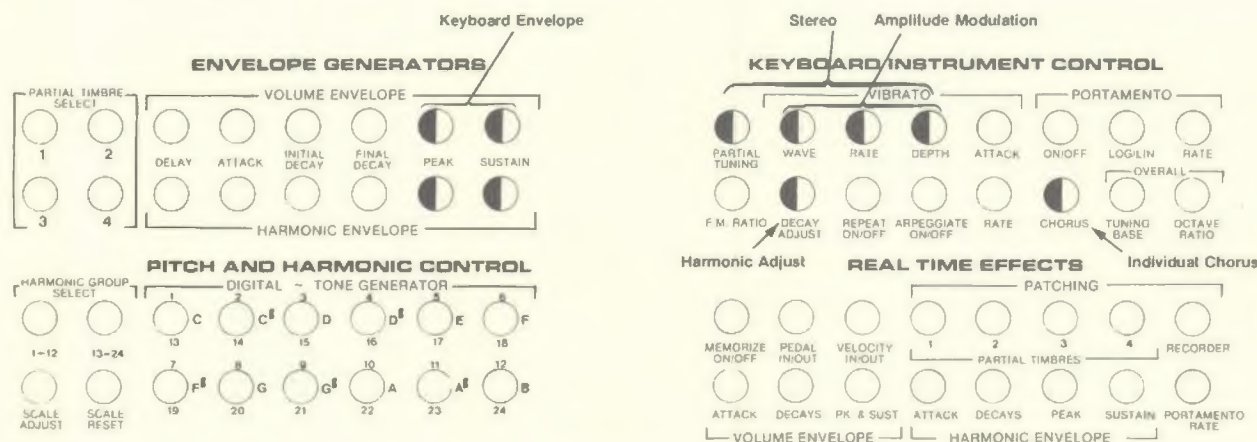
As with all Synclavier® II software releases, you may update your Synclavier II system simply by loading from your new diskette. Upon successful loading, the digital display window on the keyboard unit will display the letter H plus the number of voices in your system. If you have a Winchester disk, you may use the Installation program to install the new software on your Winchester.

MEMORY REQUIREMENTS FOR RELEASE H

To use the Release H operating system, you must have a minimum of 40K memory in your system. To use the Alphanumerical Timbre Display version of Release H, you need 48K. And to use the Graphical Timbre Display System, you need 56K.

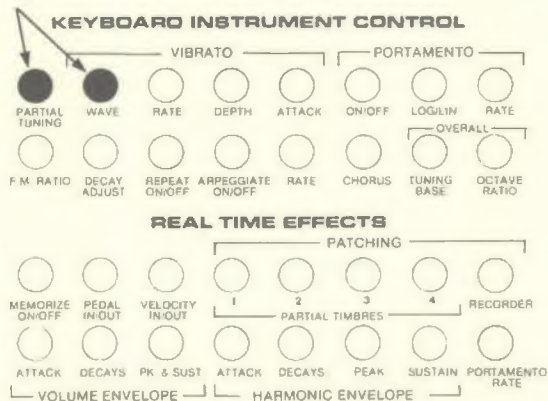
Release H adds new functions to several of the buttons in the ENVELOPE GENERATORS and KEYBOARD INSTRUMENT CONTROL panels on the Synclavier® II keyboard unit. To use some of these new functions, you must put the panels into an alternate mode of operation called the **blinking mode**. In this mode, when you push certain buttons, they will start blinking and will not perform their regular functions, but related ones instead. For instance, in the blinking mode, the DECAY ADJUST button becomes a "harmonic adjust" button.

Other buttons which have new functions in the blinking mode are: PARTIAL TUNING, VIBRATO WAVE, RATE and DEPTH, CHORUS, VOLUME ENVELOPE PEAK and SUSTAIN, and HARMONIC ENVELOPE PEAK and SUSTAIN. The other buttons in the ENVELOPE GENERATOR panel are completely inactive when the panel is in the blinking mode.



BLINKING MODE BUTTONS

Press together to enter or exit blinking mode.



The buttons in the PITCH AND HARMONIC CONTROL, MEMORY RECORDER, REAL TIME EFFECTS, and STORE/RECALL panels are unaffected by the blinking mode.

To enter or exit the blinking mode, you push the PARTIAL TUNING and VIBRATO WAVE buttons at the **same time**.

The stereo control features of Release H are designed for the Stereo Option which is now available for the Synclavier® II. (If you do not have the Stereo Option installed, these features will have no effect on the output from your Synclavier® II.)

Software controls allows you to balance the dual outputs of each individual partial timbre precisely. You can "place" each partial timbre on any of 100 "locations" between left and right speakers. Thus, a timbre with four partial timbres can appear to come from four different locations. When a memory recorder sequence is played, sounds can appear to come from as many locations as you have voices in your Synclavier® II.

You can also program each partial timbre so that it will move around during live performance or playback of recorded sequences. A partial timbre can move according to key location or it can automatically pan from speaker to speaker during held notes. One sound can move from left to right while others move in the reverse direction. Or, with proper placement of the speakers, some sounds could move toward the listener while others recede.

All stereo control functions are accessed when the control panel is in the blinking mode. The stereo buttons are PARTIAL TUNING, VIBRATO WAVE, RATE, and DEPTH. The PARTIAL TUNING button is used to place the partial timbre in the stereo image, the WAVE button is used to select a particular stereo mode, the RATE button is used to select a rate for automatic panning, and the DEPTH button is used to determine a panning range.

DEFINING THE STEREO POSITION

The dual outputs of each partial timbre produce a stereo image, or auditory perspective between left and right speakers. This image is divided into 100 **stereo positions**. Each position has a value from -50 for full left to +50 for full right.

The default stereo position assigned to each partial timbre is 0. Thus, unless you change the stereo position, a note played with the partial timbre will appear to come from the center of the stereo image. You use the following procedure to establish a different stereo position for a partial timbre.

First activate the blinking mode by pressing the PARTIAL TUNING and VIBRATO WAVE buttons simultaneously. Next press the PARTIAL TUNING button and use the control knob to dial the desired stereo position.

Recall Timbre 1-1 and try the following:

1. Select the blinking mode (press PARTIAL TUNING and VIBRATO WAVE simultaneously).
2. Press PARTIAL TUNING.

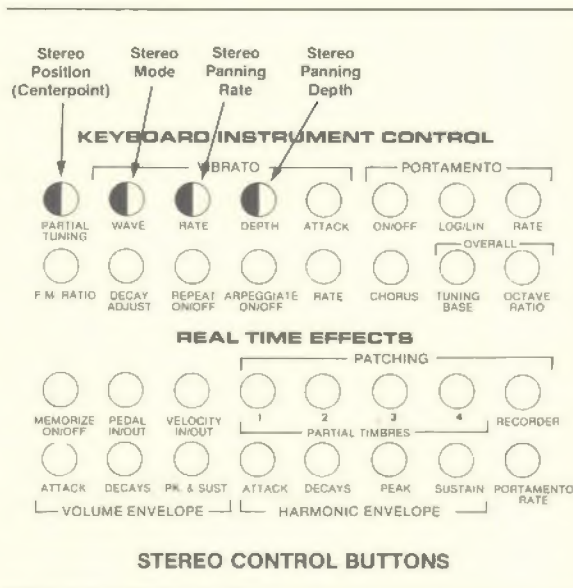
The PARTIAL TUNING button will blink and the number 0 will appear in the window. The dual outputs of the partial timbre are balanced between left and right speakers.

3. While holding down a note, turn the control knob to the left.

The sound should move toward the left speaker.

4. Now hold down a key and turn the knob toward the right.

The sound should move toward the right speaker.



STEREO CONTROL BUTTONS

MOVING STEREO

The stereo position can also serve as a **centerpoint** for a moving sound rather than as a static position. The pattern, speed, and range of the movement is programmed by the three other stereo buttons: VIBRATO WAVE, RATE, and DEPTH.

The WAVE button is used to select a particular stereo mode. There are, at present, sixteen modes and they are all described below. Some of the modes position the sound of each note according to the key that is being pressed, others place the sound according to the position of the pedal, and others provide automatic panning around the stereo image during held notes. (Note: in the exercise above, you were in the default stereo mode where the sound of each note remains at the defined stereo position.) After pressing WAVE, you may dial a stereo mode with the control knob or step to a mode by repeatedly pressing the WAVE button.

The RATE button and control knob are used to set the **rate** for the automatic panning modes. You may dial any rate between 0 and 2.5 hertz.

The DEPTH button and the control knob are used to set a **range** of movement within the stereo image. How this range will be used is determined by the particular stereo mode that you are in.

The four functions - stereo position, mode, rate, and range - work together and can be used to set up many different stereo situations. The following section will show you how they work together in automatic "sine wave" panning.

AUTOMATIC PANNING

In all of the automatic panning modes, the right end of the panning range will be located at the centerpoint setting **plus** the DEPTH setting. The left end of the panning range will be equal to the centerpoint setting **minus** the DEPTH setting. The total panning range is limited by the full left and full right positions, or +50 and -50. Thus, the maximum stereo pan is established by a centerpoint setting of 0 and a DEPTH setting of 50.

To repeat,

centerpoint + depth = right end of panning range

centerpoint - depth = left end of panning range

Try the following exercise with Timbre 1-1. You will use mode number 9, which produces an automatic "sine wave" pan around the centerpoint.

Remember, you must be in the blinking mode.

1. Press PARTIAL TIMBRE and dial a stereo position, or centerpoint, of -10.
2. Press RATE and dial a rate of 1 Hz.
3. Press DEPTH and dial a depth of 35.
4. Press WAVE and dial 9 (or step to 9).
5. Now hold down a note.

The output should begin at the centerpoint of -10, slightly to the left of center in the stereo image. Then, following a sine wave curve, the output should pan to 25 (or -10 + 35) on the right and then to -45 (or -10 - 35) on the left, once each second.

6. Try experimenting with different rates and depths.

With a depth or a rate of 0, there will be no panning.

The stereo position or centerpoint, as well as the stereo mode, rate, and depth will be saved along with the other partial timbre information when you store the timbre on diskette. This stereo information is also recorded when you create a sequence. You can also add stereo to old recorded sequences simply by adding stereo to the timbres in them.

THE STEREO MODES

You have now used two of the sixteen different stereo modes. Many of the stereo modes are in pairs with the second mode in the pair providing the mirror image of the first. Some of them are trigger modes, where each note will place the output in a different location in the stereo image. Others, such as number 9, are automatic panning modes, where the output will be moved around in the stereo image at the specified rate while you hold down a key.

In addition, the automatic panning modes can be divided into two groups: those that are synchronous and those that are independent. Modes 9-12 are all **synchronous** modes. The panning of different notes is synchronized. For example, if you are playing a four-note chord, all four notes will be panned in synchrony. As you add a fifth note to the chord, it will be synchronized as well. In addition, if you release all notes and then press another, the panning will pick up at the point in the panning cycle where you left off.

Modes 15-18 are all **independent** automatic panning modes. The panning of each note will begin at the beginning of the panning cycle, at the centerpoint for the partial timbre. Each note will be panned independently of other notes that are sounding at the same time.

You will probably use the synchronous modes for normal production and the independent modes for special effects.

Stereo Modes

- 0 This is the default stereo mode. The output of the partial timbre will remain at the defined stereo position.
- 1 This mode is used with the pedal plugged into the REAL TIME EFFECTS jack. When the pedal is all the way up, the stereo output will be at the centerpoint. When the pedal is all the way down, the stereo output will be at the centerpoint setting plus twice the depth setting. (This is different from the automatic panning range described above.) By moving the pedal up and down, you can place individual notes anywhere between these two points.

Suppose the centerpoint is set at -50 and the depth is set at 50. When the pedal is up, the output will be located all the way left. When the pedal is down, the output will be located all the way to the right $(-50 + (2 \times 50) = +50)$.

- 2 This mode is the same as mode number 1, except that the up and down positions on the pedal have the reverse effect. In this mode, when the pedal is all the way up, the stereo output will be located at centerpoint setting plus twice the depth setting. When the pedal is all the way down, the stereo output will be located at the centerpoint.

Having these two modes allows you to move two partial timbres in opposite directions with one pedal movement. Just select stereo mode number 1 for one partial timbre and stereo mode number 2 for the other partial timbre. All of the following pairs of modes can be used in a similar way if desired.

- 3 This mode maps the keys on the keyboard to different stereo positions. That is, the key that you press will determine where the sound will appear in the stereo image. With a centerpoint setting of 0 and a depth setting of 50, the lowest note on the keyboard will come from the left speaker, the highest note will come from the right speaker, and middle F# will come from the center of the image. Centerpoint and depth values can be adjusted to change the center key on the keyboard or the range of available stereo positions to match the range of notes you are actually playing. Trial and error experiments should be used to achieve the exact layout you have in mind.
- 4 This mode is the mirror image of mode number 3. The high and low notes on the keyboard have the reverse locations in the stereo image.
- 5 This mode provides an automatic "ping pong" between the left and right ends of the panning range. Each new note will trigger a move to the opposite end. For example, with a centerpoint setting of 0 and a depth setting of 50, the first note will be located all the way left (-50), the second note all the way right (+50), the third all the way left, etc.
- 6 This mode is the mirror image of mode number 5. The first note will be all the way right and the ping pong will proceed from there.
- 7 Reserved for future development
- 8 Reserved for future development
- 9 This mode provides synchronous automatic panning using a sine wave. You experimented with this mode above.
- 10 This mode is the mirror image of mode number 9. The panning will begin to the left.
- 11 This mode provides synchronous automatic panning using a square wave. The output will jump from the left end of the panning range to the right end and back again at the specified rate. This mode is primarily designed for special effects.
- 12 This mode is the mirror image of mode number 11. The output will start by jumping from right to left. This mode is primarily designed for special effects.
- 13 Reserved for future development
- 14 Reserved for future development
- 15 This mode provides independent sine wave panning from left to right.
- 16 This mode provides independent sine wave panning from right to left.
- 17 This mode provides independent square wave panning from left to right. This mode is primarily designed for special effects.
- 18 This mode provides independent square wave panning from right to left. This mode is primarily designed for special effects.
- 19, 20 These two modes provide random panning. Each note will be placed at a random position within the panning range. The intervals between the positions will be uniform across the pan (although your ear may not hear it this way!). These modes are useful for special effects (for example, alarm clock chimes). Mode 20 is the reverse of 19 but since they are both random you will probably not hear any difference between the two.

Release H provides several new timbre control features. These include new ways of using vibrato, harmonic adjust, amplitude modulation, keyboard envelopes, and chorus on individual partial timbres.

The new vibrato features are activated with the four VIBRATO buttons in the normal mode. All the other new features are accessed in the blinking mode.

NEW VIBRATO CONTROLS

Release H provides three new functions which can be used to modify vibrato wave shape. In addition, there are two new random vibrato wave shapes.

The three new functions are called the **Invert Bit**, the **Quantize Bit**, and the **Raise Bit**. All three are simple "on/off" functions activated when the KEYBOARD INSTRUMENT PANEL is in the normal mode. However, since there are no unused buttons that can be left lit to show you when these functions are "on," their "on" states are indicated by small red dots in the digital display window next to the vibrato wave number.

To turn on the Invert Bit, you press the VIBRATO WAVE button and hold it down while you press the VIBRATO RATE button. To turn on the Quantize Bit, you press VIBRATO WAVE and DEPTH. And to turn on the Raise Bit, you press VIBRATO WAVE and ATTACK button. You can turn on any or all of the three bits. Each bit will remain on until you turn it off by simultaneously pressing WAVE and the RATE, DEPTH, or ATTACK button, whichever is appropriate.

Using The Invert Bit

When the Invert Bit is turned on, the selected vibrato wave shape will be inverted. A triangle wave shape will become an inverted triangle wave shape, for example.

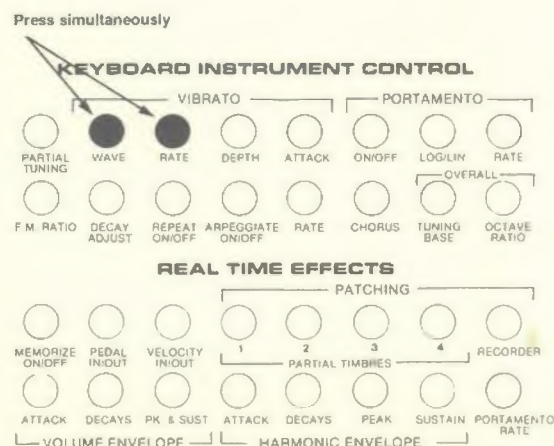
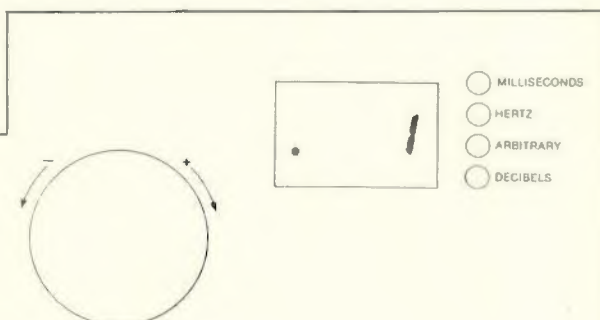
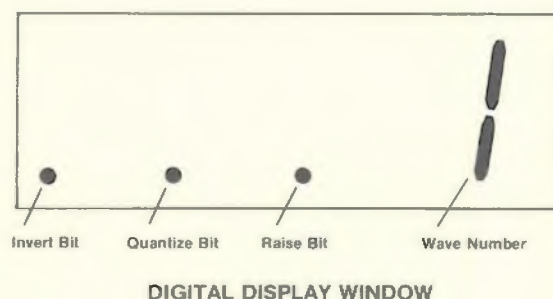
Try the following exercise with Timbre 1-1. Note that in this and following exercises the vibrato rates and depths are exaggerated so that the different effects can be heard clearly.

1. Press RATE and dial a rate of .20 Hz.
2. Press DEPTH and dial a depth of 6.00 semitones.
3. Press WAVE and dial 1 to select sine wave vibrato.
4. Play a few notes to familiarize yourself with the sound.
5. Now press WAVE and hold it down while pressing the RATE button.

You have just "turned on" the Invert Bit. A small dot will appear at the left of the digital display window. You will also note that the number 2 appears in the window, since every time you press the WAVE button, you step to the next wave number.

6. Dial 1 again to return to the sine wave; the Invert Bit will stay "on."
7. Now listen to the sound on the keyboard again. The sine wave vibrato begins in its downward phase.
8. Try some of the other vibrato wave shapes inverted.
9. To turn off the Invert Bit, press WAVE and RATE again simultaneously.

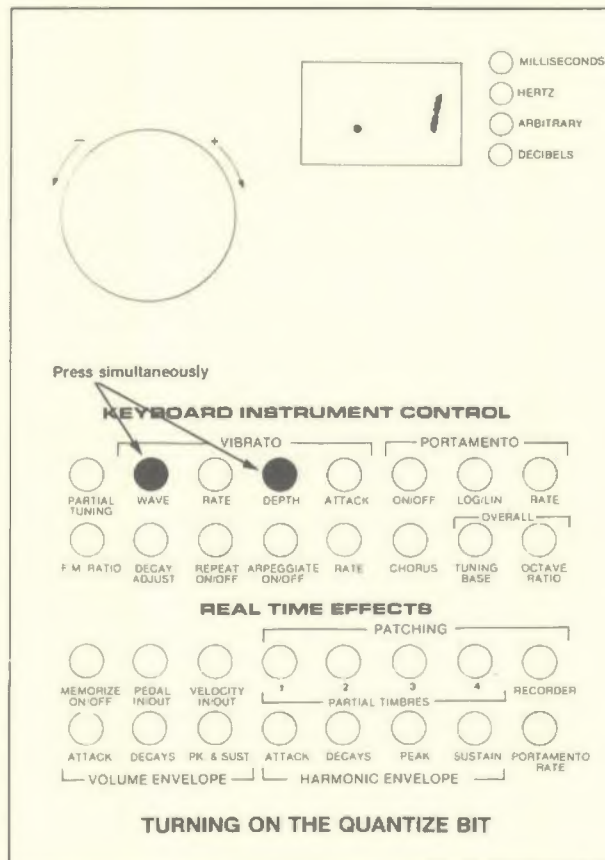
The dot will disappear from the window.



TURNING ON THE INVERT BIT

Using The Quantize Bit

Normally, the fluctuations in pitch produced by the vibrato function on the Synclavier® II are smooth and gradual. When the Quantize Bit is turned on, however, the fluctuations in pitch will not be smoothed; rather they will be **quantized**, or stepped, in semitone intervals. This feature can be used for a variety of effects, as you will see, since be playing just one note, you will trigger several.



Try the following with Timbre 1-1:

1. Dial a VIBRATO RATE setting of .20 Hz and a DEPTH of 6.00 semitones, and select WAVE number 1.

As you hold down a key, the pitch will smoothly fluctuate around the pitch of the note within a total range of one octave.

2. Turn on the Quantize Bit by pressing WAVE and DEPTH simultaneously.

A small dot will appear in the digital display window just to the right of the location of the Invert Bit.

3. Dial WAVE 1.

4. Now hold down a note on the keyboard.

The sound will step through the octave sine wave in semitone intervals. Note how the tempo mimics the shape of the sine wave, slowing around the peaks and speeding on the journeys up or down.

Note that the VIBRATO RATE refers to the number of complete wave cycles per second, not to the number of steps per second.

5. Now try the triangle vibrato wave shape with the Quantize Bit turned on.
6. Try changing the VIBRATO DEPTH. You will note that the intervals between steps will remain semitones.
7. To turn off the Quantize Bit, press the WAVE and DEPTH buttons simultaneously.

Special Tunings and Other Experiments with Quantized Vibrato

The frequencies for the steps in quantized vibrato will be determined by the current SCALE ADJUST settings. Remember, the default SCALE ADJUST settings are the frequencies of the semitones of the chromatic scale. You can change these settings to create an infinite variety of note sequences. Try using quantized sine wave vibrato after changing the pitch of one or more notes in the scale. (For information on dialing in special tunings, turn to page 94 of the *Synclavier® II User Guide*.)

You will also want to experiment by combining quantized vibrato with the REPEAT function. Set up a REPEAT RATE that is integrally related to, but not, necessarily, identical with the VIBRATO RATE. Then, as you hold down a note, the volume and harmonic envelopes will be applied periodically to different steps in the cycle. The ARPEGGIATE function can also be added.

You can combine any or all of these functions in very complicated "sample-and-hold" or "sequencer" effects. The possibilities are endless.

Using The Raise Bit

Normally, when vibrato is added to a partial timbre, the pitch of each note will fluctuate above and below the pitch of the key being pressed. The total range in semitones is determined by the DEPTH setting. When the RAISE BIT is turned on, the key being pressed becomes the "bottom" of the vibrato. The "top" of the vibrato for each note will be the pressed key plus the number of semitones in the DEPTH setting.

This feature makes it easy to control the range of your vibrato precisely.

Try the following with Timbre 1-1:

1. Dial a RATE of 5.00 Hz and a DEPTH of 1 semitone, and select WAVE 1.

2. Hold down middle C.

The pitch of the note will fluctuate from B to C#.

3. Turn on the Raise Bit by pressing WAVE and ATTACK simultaneously.

A small dot will appear in the digital display window just to the right of the location of the Quantize Bit.

4. Dial wave number 1 again.
5. Now play middle C again; the pitch will fluctuate from C to D.
6. To turn off the Raise Bit, press WAVE and ATTACK simultaneously.

Random Wave Shapes 11 and 12

There are two new vibrato wave shapes: number 11 and number 12. Wave number 11 is a random vibrato wave shape applied to the carrier waveform alone. Wave number 12 is a random vibrato wave shape applied to both the carrier and the modulator. The new wave shapes are dialed in or stepped to in the usual way.

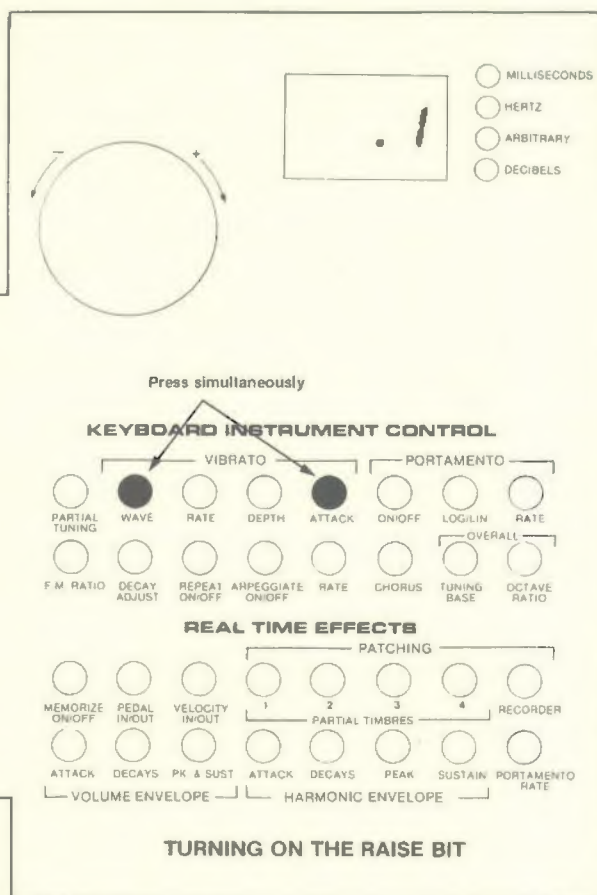
By random we mean that an arbitrary wave shape will be calculated for the vibrato using pitches within the range set up by the current VIBRATO DEPTH. The random value is passed through a digital sample-and-hold with a clock rate determined by the VIBRATO RATE.

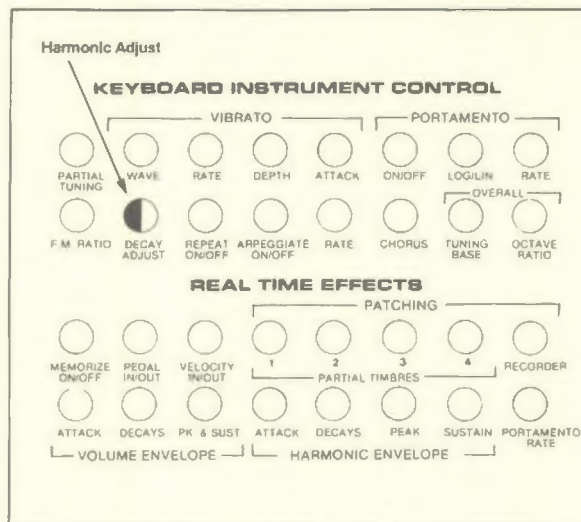
You'll probably never get exactly the same wave shape twice.

Try the following with Timbre 1-1:

1. Dial a RATE of .50 Hz and a DEPTH of 6.00.
2. Select WAVE number 11.
3. Hold down a note.
4. Now turn on the Quantize Bit, keep wave number 11, and listen to the steps in the random wave shape.
5. Set the HARMONIC ENVELOPE SUSTAIN setting to 60. You must have FM in order to hear the full effect of wave number 12.
6. Select wave number 12 and listen to it with and without the Quantize Bit turned on.

Note that when you save a timbre on diskettes, any selected Invert, Quantize, and Raise functions and/or wave shapes 11 and 12 will be saved along with the other partial timbre information.





USING HARMONIC ADJUST

Release H provides the "harmonic adjust" feature which enables you to adjust the depth of modulation, or FM overtone content, of a partial timbre across the octaves of the keyboard. You can create a partial timbre with strong FM overtones on the bottom notes and very slight overtones on the top notes. Or vice versa. This feature helps you to increase the brilliance of "mushy" lower notes without producing harshness in the upper notes, to create timbres which are consistent across the keyboard, and to reduce the amount of external equalization needed for some sounds.

As you know, the FM overtone content in a partial timbre is established by its HARMONIC ENVELOPE (HE) PEAK and SUSTAIN settings (pages 57-58 in *Synclavier® II User Guide*). For any partial timbre without "harmonic adjust," the same settings will be used for every note across the keyboard. When "harmonic adjust" is added, the overtones established by the HE PEAK and SUSTAIN settings will be applied to a middle note. The overtone content of the notes above and below this note will be determined by the slope of the "harmonic adjust" curve.

The procedure for establishing the slope of this curve follows: First, you activate the blinking mode by pressing PARTIAL TUNING and VIBRATO WAVE simultaneously. Then you press the DECAY ADJUST button to select the "harmonic adjust" function. A number will appear in the digital display window which indicates the current "harmonic adjust" slope. For any timbres without "harmonic adjust" (this would include all timbres programmed prior to Release H), this number will be 0, indicating **no** "harmonic adjust." Thus, your old timbres will sound the same as before.

To add more FM to the notes below the middle note while decreasing the FM on the notes above, you turn the control knob to the left. Negative numbers from -1 to -30 will appear in the digital display window. The further you turn the knob, the sharper will be the slope of the adjustment curve. The low notes will have stronger and stronger FM; the high notes will have less and less.

For the reverse - more FM on the high notes and less on the low notes - you turn the control knob to the right. Positive numbers from 1 to 30 will appear in the digital display window.

Try the following with Timbre 5-2 (you must have a timbre with above zero settings for HARMONIC PEAK and SUSTAIN for this feature to be meaningful):

1. Select the blinking mode (press PARTIAL TUNING and VIBRATO WAVE simultaneously).
2. Now press the DECAY ADJUST button.
The DECAY ADJUST button will start blinking and the number 0 will appear in the digital display window.
3. Play the timbre up and down the keyboard to familiarize yourself with the sound.
4. Turn the knob to the left, stopping on various settings and experimenting on the keyboard.
5. Continue the experiment by turning the knob to the right.

Note that when you save a timbre on diskette, the "harmonic adjust" setting will be stored along with all the other partial timbre information.

AMPLITUDE MODULATION

Release H allows you to give amplitude modulation, or tremolo, to a partial timbre.

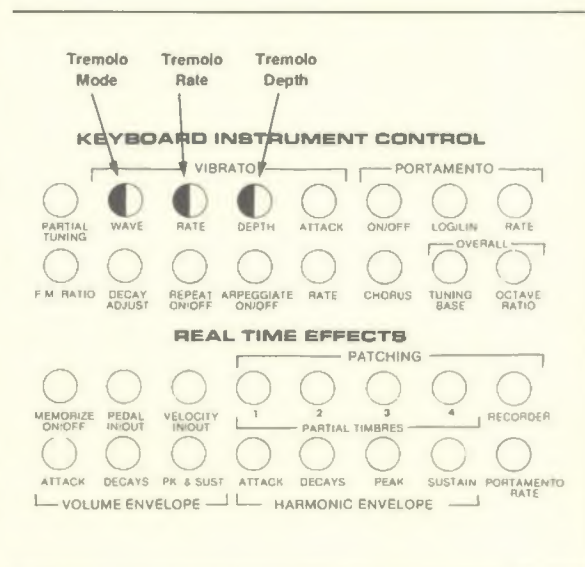
The VIBRATO WAVE, RATE, and DEPTH buttons are used in the blinking mode to program tremolo.

The VIBRATO WAVE button is used to select one of four tremolo modes: 21, 22, 23, and 24. The uses for these modes are described below.

The RATE button is used to establish a tremolo rate between 0.0 and 2.5 hertz.

The DEPTH button is used to establish the tremolo depth, or the amount the amplitude will fluctuate down from full volume. The range is from 0 to 50. With a setting of 0, the amplitude will not fluctuate, but will remain at specified VOLUME ENVELOPE PEAK and SUSTAIN levels. With a setting of 50, the amplitude will fluctuate from the full specified level to zero level.

(NOTE: The same buttons are used in the blinking mode to select mode, rate and depth for both stereo and tremolo. If you select one of the tremolo modes, the 0 stereo mode will automatically be selected and the RATE and DEPTH buttons will then be applied to tremolo. You will still be able to select a stereo position with the PARTIAL TUNING button. But you cannot have moving stereo and tremolo at the same time.)



Four Tremolo Modes

There are four tremolo modes:

- | | |
|----|--------------------|
| 21 | Synchronous Attack |
| 22 | Independent Attack |
| 23 | Synchronous Decay |
| 24 | Independent Decay |

The **attack** modes begin at the lowest point in the modulation cycle and rise to full volume. The **decay** modes begin at the full volume point in the modulation cycle and drop down to the low.

The terms **synchronous** and **independent** are used in the same way as they are in the stereo modes. In the synchronous modes, amplitude modulation will be synchronized for all notes on the keyboard. Thus, if you are playing a four-note chord, all four notes will be modulated in synchrony. As you add a fifth note to the chord, it will be in sync with the others. In addition, if you stop playing and then begin again, the volume level will pick up at the point in the modulation where you left off.

With the independent tremolo modes, the modulation of each note will begin at the beginning of its modulation cycle, either at the top level or the bottom, depending on whether it is an attack or decay mode. Each note will be modulated independently of other notes that are sounding at the same time.

Try the following with Timbre 2-1:

1. Select the blinking mode (press PARTIAL TUNING and VIBRATO WAVE simultaneously).
2. Press WAVE and dial 21 (synchronous attack).
3. Press RATE and dial 1.0 for a slow, obvious amplitude modulation.

4. Press DEPTH and dial 25 for a fluctuation between half and full loudness.
5. Play a note.
The sound will start softly and rise to full volume.
6. Play several notes together.
The amplitude modulation will be synchronized.
7. Now press WAVE and change the mode to 22 (independent attack).
8. Play several notes. They will be independent of each other.
9. Press WAVE and change the mode to 23 (synchronous decay). When you play a note, it will start at full volume and then drop.
10. Experiment with wave number 24 (independent decay) and with different rates and depths.

Note that when you save a timbre on diskette, the amplitude modulation mode, rate, and depth will be saved along with the other partial timbre information.

DEFINING THE KEYBOARD ENVELOPE

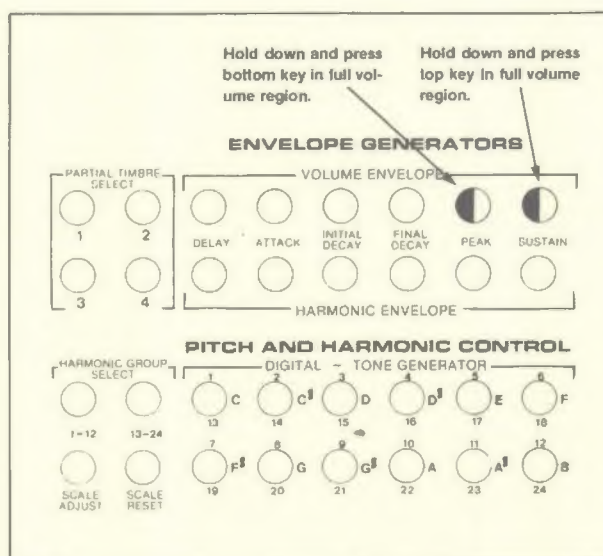
Release H allows you to place a partial timbre on a particular section of the keyboard. You can place different partial timbres within the same timbre on overlapping or separate sections of the keyboard. For special effects, you can assign completely different sounding partial timbres to different sections of the keyboard. Or, if you are after realism, you can use this feature to develop timbres, such as piano and strings, that may be played up and down the keyboard with authenticity throughout. Each partial timbre could be carefully programmed to sound natural over the region of notes to which it is assigned on the keyboard.

The section on the keyboard to which a partial timbre is assigned is called the **keyboard envelope**. It consists of three parts: the **full volume region** (or the keys which will play the partial timbre at its full specified volume) and **lower and upper tapered regions** (or the keys above and below the full volume region where the sound gradually diminishes). The tapered regions need not be used.

The VOLUME ENVELOPE (VE) and HARMONIC ENVELOPE (HE) PEAK and SUSTAIN buttons are used in the blinking mode to program the keyboard envelope.

You use the VE PEAK and SUSTAIN buttons and the keys of the keyboard to define the full volume region. You press VE PEAK and, while holding it down, press the desired bottom key in the region. The key number, from 1 for the lowest C to 61 for the highest C, will appear in the digital display window. Then you press VE SUSTAIN and, while holding it down, press the desired top key in the region. Another key number will appear in the window.

Now, if you press a key within the defined region, the partial timbre will sound at its full volume. If you press any key outside this region, no sound will be heard and bars will appear in the digital display window.

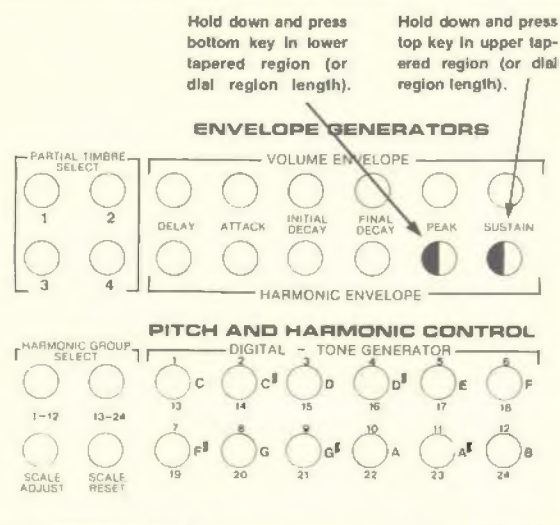


You use the HE PEAK and SUSTAIN buttons and the keys **or** the control knob to set up the tapered regions. To establish the lower tapered region, press HE PEAK and, while holding it down, press the note below the keyboard region where you want the sound to bottom out. The number in the digital display window will indicate the length in numbers of keys of the tapered region. Alternatively, you could dial this number with the control knob while holding down the HE PEAK button. The volume will be gradually decreased on each key from the bottom of the full volume region to the bottom of the tapered region.

To establish the upper tapered region, press HE SUSTAIN and, while holding it down, press the key above the full volume region where you want the sound to bottom out. Or dial the length of the region with the knob. The volume will be decreased gradually on each key as you move up in the tapered region.

The keyboard envelopes of different partial timbres in the same timbre can overlap. The keyboard envelopes will be stored along with the other partial timbre settings when you save a timbre. All the partial timbres in the timbre will be recorded on the same track in the memory recorder, just as always.

Note that you can also use a split keyboard along with the keyboard envelope feature and effectively assign eight different sounds to the keyboard.



Try assigning the three different partial timbres of Timbre 2-2 to different segments of the keyboard.

1. Solo Partial Timbre #1.
2. Select the blinking mode (press PARTIAL TUNING and VIBRATO WAVE simultaneously).
3. Hold down VE PEAK and press middle C.

The key number 24 will appear in the digital display window.

4. Hold down VE SUSTAIN and press the C above middle C.

The key number 36 will appear in the digital display window. You have assigned a full volume region from middle C to the C above. Now if you play up and down the keyboard, sounds will only be produced in the middle octave.

5. Now hold down HE PEAK and press the C below middle C.

The number 12, indicating a tapered region of 12 keys, will appear in the window.

When you play the octave below middle C, the notes will decrease in volume until at the C below there is no sound.

6. Now hold down HE SUSTAIN and dial the number 12. This sets up a tapered region of 12 keys above the full volume region.

When you play the octave above the middle octave, the notes will decrease in volume until at the C above there will be no sound.

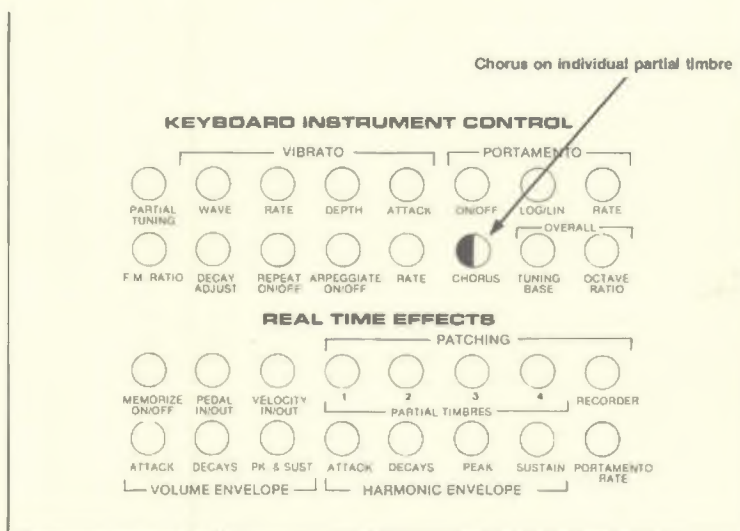
7. Continue by assigning different keyboard envelopes to the other partial timbres in the timbre.

CHORUS ON INDIVIDUAL PARTIAL TIMBRES

Individual partial timbres can now be given the chorus effect. This allows you to add a voice to one or more partial timbres without affecting the others in the timbre. By assigning chorus to one partial timbre in a four partial timbre sound, for example, you could create a five partial timbre sound.

To use this feature, you first activate the blinking mode. Then you select the partial timbre you wish to chorus, press the CHORUS button and dial in the desired chorus ratio.

You can also apply the overall chorus function to a timbre with individually chorused partial timbres. Just place the control panel in the normal mode and dial in chorus as usual. By adding overall chorus to a timbre with four individually chorused partial timbres, you can create a very powerful 16-voice sound.



SLURRING NOTES

A foot switch connected to the ARPEGGIATE jack on the back of the keyboard unit can now be used for slurring or phrasing of **monophonic** timbres. You play a note and then press the foot switch. While you hold down the switch, any notes that you play before releasing the previous one will be slurred. The pitch will change without retriggering the attack.

This feature is very helpful in creating melodic lines for violin timbres, for example.

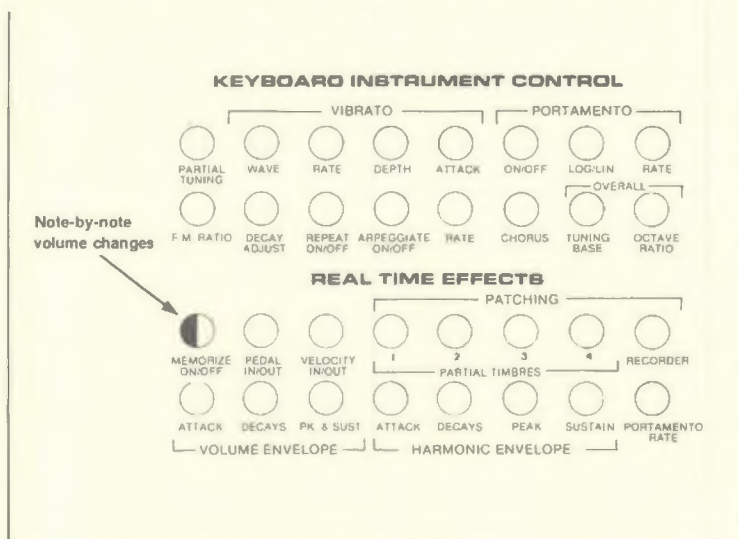
Timbres that are not monophonic will be arpeggiated as usual.

NOTE-BY-NOTE VOLUME CHANGES

There are now two modes for overall volume control. In the first mode, the volume pedal works as it did previously. When you move the pedal, the volume changes instantly even in the middle of a note.

The second mode provides note-by-note volume change. It is primarily designed so that you can record volume changes during a sequence. But you may wish to use this mode in performance as well. In this mode, volume changes can only occur at the beginning of notes. If you move the pedal during a note, the volume change will not be heard until the beginning of the next note.

You change from mode to mode by pressing the MEMORIZE button. When this button is blinking, you will be in the "memorize volume change" mode, with note-by-note volume changes. More on recording with this mode appears in the next section.



There are several new features for the memory recorder that will help you in precise recording and keyboard editing of recorded sequences. You may now also record real-time effects and volume changes on top of previously recorded sequences.

RHYTHMIC JUSTIFICATION

The rhythmic justification of keyboard performances that was provided in Release G of the Synclavier® II operating system is still available in Release H. However, you no longer press the EXT. SYNC. button to activate this function. Now, to specify rhythmic justification during recording, you press the BOUNCE button twice, at which point it will start blinking. Then press RECORD to begin recording with rhythmic justification.

Thus, rhythmic justification is now independent of the external synchronization modes.

EXTERNAL SYNCHRONIZATION FOR RECORDING

You can now use the EXT. SYNC. function for recording as well as for playback. Either the 50 Hz signal synchronization (lit EXT. SYNC. button) or the external beat synchronization (blinking EXT. SYNC. button) modes can be used. (For an explanation of the 50 Hz Synchronization, see page 112 of the *Synclavier® II User Guide*; for an explanation of external beat synchronization, see the *Release G Documentation Update*.)

CLICK RATE MULTIPLIER

To make justified recording easier, Release H provides the click rate multiplier function. This allows you to set the click rate for rhythmic justification according to the beat of your piece rather than to the shortest note in it.

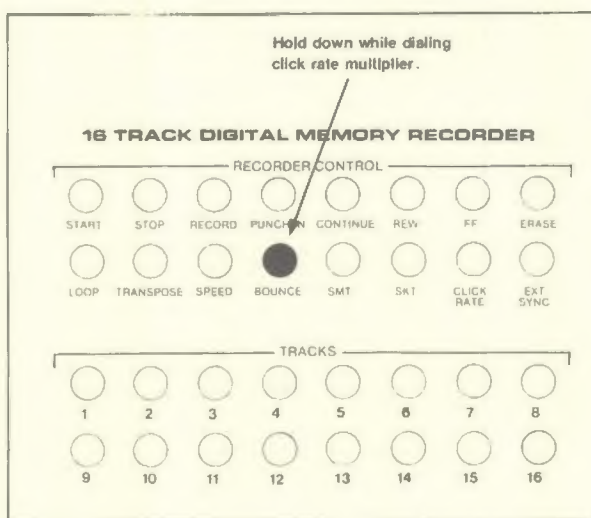
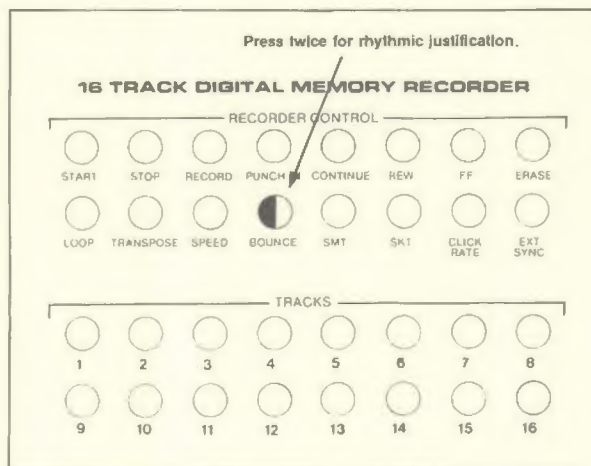
The current click rate is multiplied by the setting for the click rate multiplier. This produces additional internal, inaudible "clicks." Short notes played between the audible clicks will be justified with these internal rhythmic units.

To set the click rate multiplier, you press the BOUNCE button and hold it down and dial a number from 0 to 16.

For example, if you wished to record in 4/4 time, you could set the click rate to one beat for each quarter note. Then, if you had sixteenth notes in your piece, you could set the click rate multiplier to 4, since there are four sixteenths in a quarter note. Each quarter note, eighth note, and sixteenth note would be correctly justified. If you had thirty-second notes in the piece, you could set the multiplier at 8.

If you wished to record in 6/8 time, you could set the click rate at two beats per measure and the multiplier at 3. Then each eighth note would be justified. To record sixteenth notes in such a piece, set the multiplier at 6.

The click rate multiplier also affects outputted and inputted sync pulses in the external beat synchronization mode. Sync pulses will be emitted from the EXT. CLOCK jack at the current click rate times the setting for the click rate multiplier. Sync pulses fed into the EXT. CLOCK INPUT jack will be divided by the current setting for the click rate multiplier. This permits you to use faster signals to drive the memory recorder. The maximum number of sync pulses per second, either in or out, is 40. The results are unpredictable with a faster rate.



CLICKS IN FRAMES

The Synclavier® II can now produce accurate digital frame rate clicks on a 24 frames per second basis. This means that you can dial a click rate in terms of frames per click. To enter the new **frames-per-click mode**, you press the SPEED button **twice**. The number .960 will appear in the digital display window. (You could also dial this number.) This initial SPEED adjustment is necessary so that accurate frame rate clicks can be produced.*

Then you press CLICK RATE and a number representing frames per click will appear in the window. The default number will be 12.4. Note that the number to the right of the decimal point is in base 8. With the default setting, there will be a click rate of 12 and 4/8 frames per click. You may dial a click rate from .5 frames per click to 249.7 frames per click.

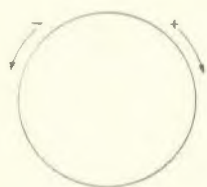
To specify click rate in beats per minute or periods in milliseconds, you must restore the SPEED setting to 1.000 by pressing SPEED again. Since this will change the speed of the memory recorder, you should decide **before** recording whether to use frame rate clicks or clicks in terms of time.

* This timing adjustment is required because of the 5-millisecond time base of the Synclavier® II. With a SPEED setting of .960 and a 24 frames per second rate, each frame will equal .04 seconds. An eighth of a frame will exactly equal one 5-millisecond tick of the Synclavier® II internal clock.

Suppose you wanted to set up a click rate of 12 frames per click. Proceed as follows:

1. Press SPEED twice.

The number .960 will appear in the window.



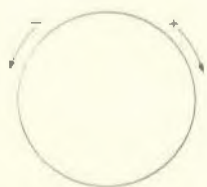
.960

- ☐ MILLISECONDS
- ☐ HERTZ
- ☒ ARBITRARY
- ☐ DECIBELS

2. Press CLICK RATE.

The number 12.4 will appear in the window.

3. Dial 12.0



12.0

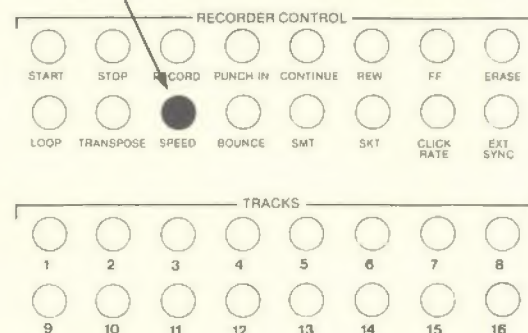
- ☐ MILLISECONDS
- ☐ HERTZ
- ☒ ARBITRARY
- ☐ DECIBELS

4. Press START or RECORD.

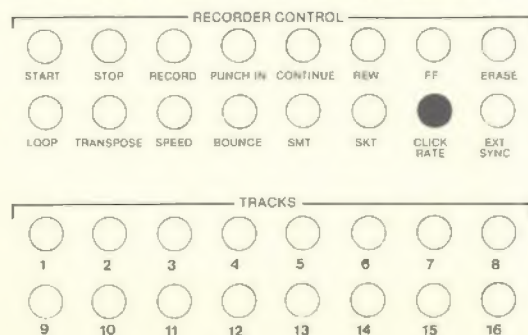
Clicks will now be produced at a rate of one click per 12 frames.

Press twice

16 TRACK DIGITAL MEMORY RECORDER



16 TRACK DIGITAL MEMORY RECORDER

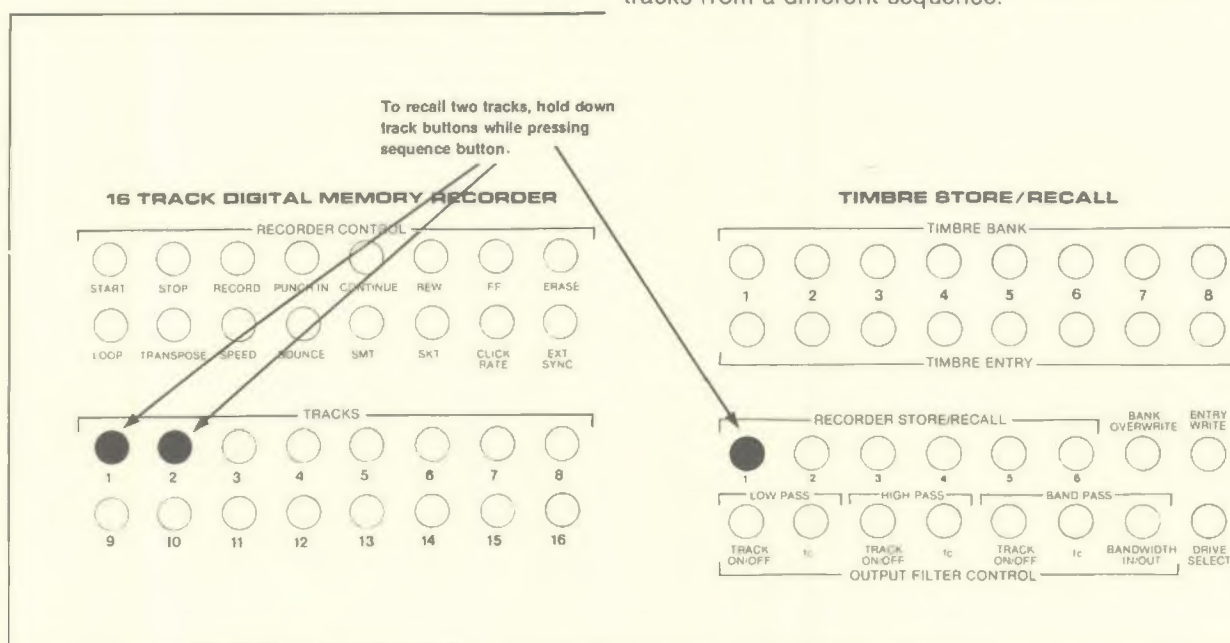


Note that if you are in the external beat synchronization mode (blinking EXT. SYNC. button), the click rate will be determined by external pulses and this feature will be of no effect.

RECALLING INDIVIDUAL TRACKS

You may now recall one or two tracks from a sequence on diskette rather than the entire sequence. You can thus combine tracks from different sequences easily.

Just press the TRACKS button(s) for the track(s) you wish to recall. While holding the button(s) down, press the RECORDER STORE/RECALL button for the sequence which contains the desired tracks. You can then repeat the process recalling different tracks from a different sequence.



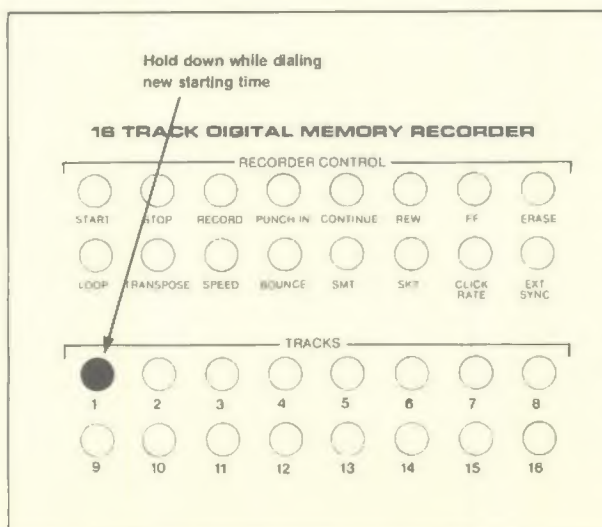
ADJUSTING THE STARTING TIME OF INDIVIDUAL TRACKS

You may now adjust the starting time of each individual track in the memory recorder by adding and subtracting whole beat rests before the first note on the track.

When you hold down the TRACKS button for a track, the digital display window will display the beat during which the first note on the track starts. By turning the knob while you continue to hold down the TRACKS button, you can change this starting beat number. Thus, you can move all the notes on the track forward or backward by whole beats as determined by the current click rate.

It is also possible to adjust the starting time of a track in millisecond intervals by adjusting the click rate appropriately. You will find that displaying the click period in milliseconds (by pressing CLICK RATE twice) will make this easier.

By recalling selective tracks and changing their starting times, you can combine and append tracks in a variety of ways.

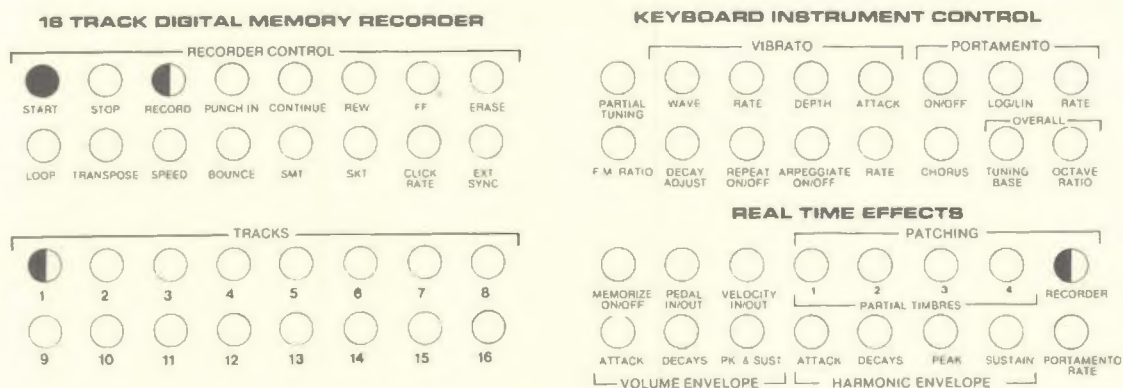


ADDING RTE AND VOLUME CHANGES TO A RECORDED SEQUENCE

The RECORDER button in the REAL TIME EFFECTS panel now has three modes: **off**, when the pedal has no effect on recording or playback, **on**, when the pedal can be used for real-time effects during playback, and **blinking**, when the pedal can be used to record real-time effects onto a previously recorded sequence. You can also use this mode to add note-by-note volume changes to a previously recorded sequence.

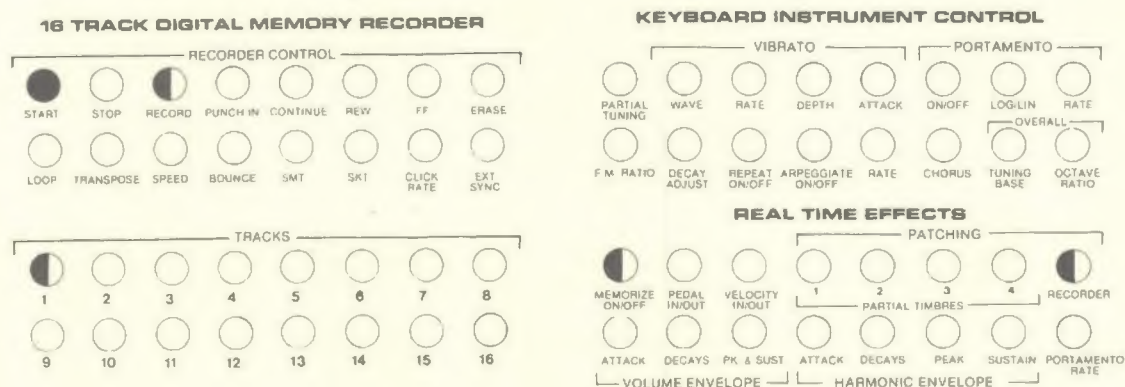
This feature allows you to record your notes without worrying about the pedal. Then, when you have the notes the way you want them, you add the real-time effects and the changes in dynamics.

The procedure for using these functions follows: First, establish the RTE patching for the timbres you wish to use in your sequence. Next, record the sequence. Then, press the RECORDER button until it blinks. Finally, press RECORD and move the RTE pedal to add the real-time effects. If not satisfied with the first pass, repeat. You can change the real-time effects without affecting the notes.



RECORDING REAL-TIME EFFECTS

To add the volume changes, you must first press the MEMORIZE ON/OFF button until it blinks to activate the "memorize volume change" mode. Then press the RECORDER button until it blinks. Finally, press RECORD and add your volume changes by moving the VOLUME pedal.



RECORDING VOLUME CHANGES

Recording real-time effects and/or volume changes uses up two notes for every note in the sequence.